



Clinical Practice

A brief history of Forensic odontology since 1775

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ABSTRACT

The increasing role of DNA sampling of the saliva on and around the tooth marks on skin or other objects has perhaps led some to rely on this as too much of a gold standard to the detriment of more established and well-tried methods of odontological forensic detection.

Forensic odontology should not become, as Geoffrey Pyke (1893–1948) the maverick inventor during the Second World War, once described such lost knowledge: “A lesson in collective forgetfulness”. This was said about the use of self sterilizing sphagnum moss as a field dressing due to a content of phenolic compounds. One amongst many of perhaps 350 species of the genus *Sphagnum*; *Sphagnum angustifolium*, was used as a highly absorbent wound dressing in both World Wars, the Spanish Civil War and before.

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“What a nightmare!... bodies as of negroes – blackened; heads carbonised; shrunk and reduced to nothing or at least, only the teeth remained.”

Dr. Oscar Amoedo (The father of Forensic Dentistry), Dental Cosmos, Paris, 1897

1. Introduction

The pattern, size and form of the human bite can be forensically extremely important, more so if the pattern of the dentition is sufficiently distinctive such as a missing tooth or a wide gap between teeth. This then can be positively matched to their assailant. Identification of bite marks can be either by the actual skin bite mark itself or from the impression on any item of hard food found at the scene of the crime. Today swabs of the bite marks for DNA can be matched either from a suspect at the time or by a later speculative search. Currently the UK database has 4.5 m profiles, less than 10% of the population. The new SGM-plus compares 10 sites, the old SGM only six; the SGM-plus accuracy is quoted as one in a billion. Where very small samples of DNA are found, the technique of LCNDNA (low copy number) has been used, though this was called into question on Prof. Allan Jamieson's evidence, by the trial Judge at the Omagh bombing trial of Sean Hoey in December 2007 as to its accuracy and reliability. As a result the case failed. In the older conventional system 150–200 cells are needed, but the problem with LCNDNA, a technique that replicates in the laboratory a few cells for their DNA, is that it is too sensitive and Dr. Edmond Locard's 1910 Principle of Contact is, once again, confirmed. DNA-boost, a computer software program that unravels these DNA samples from surfaces with mixed samples, has been also criticised by

Prof. Jamieson of the Forensic Institute, Glasgow, who said that the future success of DNAboost was at risk by a ‘cavalier’ approach to its use and the ‘serious potential of leading to the conviction of innocent people’ if this method was used wholly and uncritically.¹

An earlier article² that prompted this further historical examination of forensic odontology also showed the potential problems of clinical photography (shown below), illustrating some of the faults that can occur when an amateur, though enthusiastic, is taking the photos.

In one of the unused photographs the scale is included, but (a) it was upside down and (b) in far from perfect focus and it is rare to get a second chance with film. Even digital images can be misleading viewed on the very small camera review screen. The Guidelines from BAFO should be followed.³



2. Discussion

Bite wounds are common from dogs, cats and humans, any subsequent infection depending on the degree of tissue damage and the delay in seeking treatment. Antibacterial therapy is either oral

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or parenteral depending on the degree of infection, with surgical wound débridement if necessary. The risks of HIV, Hepatitis B, Tetanus and rabies all need to be considered. The organisms from cats and dogs are *P. multocida*, *Staph. aureus*, *Strep. spp.*, *Prevotella* and *Fusobacteriae*. Those from human bites are: *Strep. spp.*, *Staph. aureus*, *Prevotella spp.*, *Peptostrep. spp.* and *Fusobacterium spp.*, especially Vincent's organisms; *F. fusiforme* and occasionally *Borrelia vincenti*. The latter two are eponymously named for Dr. Jean H. Vincent (1862–1950) of the Val de Grace Hôpital Militaire, who also discovered *Nocardia madurae*, an etiological factor in Madura Foot.²

3. Antibiotic treatment and clinical concerns

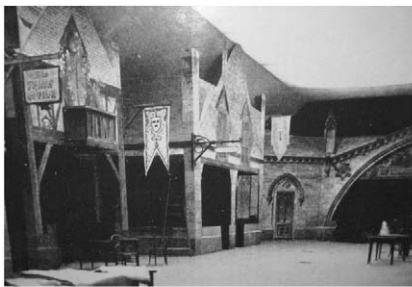
Human bites are said to be more toxic than dog bites and suggested anti-microbial therapy for all of these infections is amoxicillin-clavulanic acid, ampicillin or penicillin for 5–7 days. If obviously infected, then 2 weeks. The site, severity, chronic illnesses such as diabetes, cirrhosis and immunity of the victim should all be considered. If allergic to penicillin, then erythromycin and metronidazole can be used, even if under 12.³

When exposed to viral diseases such as HIV or HepB, by injury or assault when on duty, Metropolitan police officers benefit from an arrangement for them to be seen rapidly at any time by the on-

4. The beginnings of forensic analysis of human bites and dental identification of bodies

The first recorded medico-legal identification of a body using dental means is that of Dr. Joseph Warren, who was killed at the battle of Bread Hill, more often referred to as the battle of Bunker Hill in New England in 1775. Dr. Warren, killed during one of the earliest battles of the American Revolution by a musket ball through the skull, was buried by the British Redcoats in a mass grave and then reburied with another American. When this grave was exhumed 10 months later the body was identified by Paul Revere (renowned silversmith, amateur dentist and revolutionary) from the dental work that he had done on Dr. Warren in 1773 and in 1775. As one of the leaders of the American Revolution, Dr. Joseph Warren was given a more fitting revolutionary hero's re-burial on April 8, 1776.

Mass forensic identification by dentition was first used at Paris, in the aftermath of the fire of the Bazaar de la Charité that began around 16:00 h on the afternoon of May 4, 1897. About 1200 people were in the bazaar at the time. That year it was held in a wood, canvas and tar painted mock up of a mediaeval village on a patch of waste ground in the *rue Jean-Goujon*. The fire started from the exploding of an incandescent gas-mantle projector lamp.



Wood frame, canvas and tar-paper mock mediaeval village



Photograph taken by an English visitor to Paris on the day

call virologist at St. Thomas' Hospital. This an important asset and service as it helps allay the understandable fears of police officers if exposed to various bodily fluids and also ensures that prompt base-line blood titres are taken, a file opened, chemo-prophylaxis or γ -globulin treatment is started immediately if required, a follow up arranged either at the Hospital or with his or her GP at a later date and information leaflets supplied.

This led to 126 deaths in the resulting inferno with more than 200 seriously injured. The badly burned bodies were taken to the hall of the Palais de l'Industrie and relatives then came to try to identify them.

By noon the following day only 30 remained unidentified. What was different about this fire was that the bazaar had been held by the "greatest ladies of France" to help "the poor and needy". These



(a)

Countesses, Duchesses and other ladies had the money to have the best dentistry available at that time. At the suggestion of Señor Albert Hans, the Paraguayan Ambassador, who was trying to identify the Duchesse d'Alencon (a), their dentists: Drs. Burt, Brault, Ducorneau and Godon were called in. All 30 bodies were eventually identified thanks to meticulous dental record keeping of amalgam fillings, gold repairs, crowns and evidence of extraction spaces noted in the mandibles and maxillae of the victims.

Dr. Oscar Amoedo, a Cuban born dentist and Professor at the Dental School at Paris University at the time, subsequently wrote a short article, describing the identification procedures used in this disaster and postulated a methodology to be used as a basis in future.

This was published in *Dental Cosmos* in 1897, the year of the dreadful fire.



Dr Oscar Amoedo
1863-1945

Dr. Amoedo can truly be said to be the father of forensic odontology. His seminal work "*L'Art dentaire en médecine légale*", was published by Masson at Paris in 1898.

As a memorial to all of those who died, a magnificent Baroque church, *Notre Dame de Consolation*, was built on the actual site of the fire and can be best visited by appointment; some of the photographs used to illustrate this case were taken in November 2007.

The importance of forensic odontology and its development over the years, has resulted in its use in a number of famous cases of murder, a guilty verdict and the death penalty being imposed and sometimes, but not always, of the subsequent hanging of the person found guilty.



Notre Dame de
Consolation,
Paris.

7 lower and 8/ upper. It was almost a perfect murder, but her husband Bertie was found guilty, sentenced to hang, but reprieved to die in HMP Parkhurst on the Isle of Wight 3 years later.

In the Ruxton case of 1935 when Dr. Buck Ruxton,⁸ an Indian, was found guilty of the murders of his wife Isabella and Mary Rogerson, the latter whom it was thought had disturbed him. Despite being dismembered, both bodies were identified by their past dental histories. Dr. Ruxton was hanged at HMP Strangeways on May 12, 1936.

The Pajama Girl case of 1934 in News South Wales, Australia,⁹ showed how simple errors made by the local dentist in charting the dental work delayed identification of the body for 10 years. This latter case became famous because it showed the fallibility of a dentist who had no forensic training in odontology, the difficulty in relying on visual identification alone and the cost in terms of delay in identification.¹⁰

In the Acid Bath murders of John George Haigh at Crawley, Sussex in 1949,¹¹ it was the dentures that proved the identity of Mrs. Durand-Deacon, although people often only remember the three pure cholesterol gall stones. Only humans produce pure cholesterol stones, but the gall stones were not unique enough to allow identification. What Haigh did not know was that acrylic dentures dissolve only very slowly in concentrated sulphuric acid. Any traces of the other five other missing people were never found. Found guilty of murder after only 18 min deliberation, he was hanged at HMP Wandsworth on August 10, 1949. In the Dobkin case in London in 1942, the body of Rachel Dobkin was identified by her dentist Mr. Barnet Kopkin.¹² He made a dental sketch before viewing the body and recognised his fillings when he did. Harry Dobkin, her then husband, was found guilty of murder and hanged at HMP Wandsworth in January 1943.

The discovery on May 1, 1945 by Russians troops of the badly burned bodies of Adolf Hitler and Eva Braun and the subsequent identification of the remains was done solely on dental evidence.¹³ Dr. Hugo Johannes Blaschke, who trained in the USA, was Hitler's dentist and it was from his records that and the evidence of frontal sinus X-rays,¹⁴ which can be as unique as finger prints, and the surviving crown and bridge work made by Fritz Eichtmann, that the bodies of Hitler and his wife were eventually formally identified.

Other identification techniques include the bone trabeculation patterns of the distal femur and proximal tibia that are now increasingly being used by the US military and British forces to



The first case in Britain when a murderer was identified by his teeth marks⁴ was in 1948, in the case of the 1947 New Year's Eve dance murder at Tonbridge Wells, examined by the late Dr. Keith Simpson. Dr. Simpson was able to match the tooth marks on Phyllis Lucy Gorrings's right breast with the dentition of her husband, Robert Gorrings. He was convicted, sentenced to death, but later reprieved with a life sentence. Interpretation of the marks on the skin from teeth can, of course, be open to discussion.⁵

The Sack murder at Luton of Mrs. Manton^{6,7} in 1943 where the body was only identified after 3 months by the retained roots at 7/

identify air crash and service personnel IED victims from the current wars in Iraq and Afghanistan whose bodies have been very severely burned or disrupted by blast effects.¹⁵

X-rays taken prior to their deployment in theatres of war of frontal sinuses¹⁶ and knees and then archived can later be accessed and compared to the relevant body fragments of unidentified victims for possible further confirmation if DNA tests are inconclusive or not possible.

Although DNA has become almost ubiquitous in clinical forensics and medical jurisprudence, it would be wrong not to record

the debt that we owe to forensic odontology over the years and foolish not to continue to use the evidence that it provides allowing the truth to be found.

Conflict of Interest

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Ethical Approval

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Radiologists in 1988 entitled: “Radiology in the investigation of crime.” (personal communication)

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